

Laparoscopic Pyelolithotomy for Management of Complete Staghorn Stone of An Ectopic Pelvic Kidney

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A 40-year-old man was referred to our urology clinic due to vague abdominal pain and hematuria. Computed tomography (CT) without contrast material visualized an ectopic kidney in the left iliac fossa with a complete staghorn stone. Under general anesthesia, operation was done in supine position with a gentle lateral elevation on the right side. The surgeon stands on the right side of the patient. First, a 12 mm port was inserted at the umbilicus using the Hasson technique. After creation of pneumoperitoneum, operation was done by three 5 mm trocars were arranged as paraumbilical, the point between umbilicus and inguinal canal at left and right side.

A vertical pyelotomy incision was made over the anterior pelvic wall and then extended to a cross figure. The stone extracted intact with a laparoscopic stone grasper and placed in endobag. A short double J stent was placed via the pyelotomy incision and renal pelvis was closed using continuous 4.0 vicryl sutures. He was discharged from hospital after 3 days without any complication.

INTRODUCTION

Pelvic kidney is a rare congenital renal locational anomaly with an incidence between 1/2200 and 1/3000⁽¹⁾. The ectopic pelvic kidney is more susceptible to develop nephrolithiasis. This may be a result of the anteriorly placed pelvis, abnormal position of the uretero-pelvic junction and malrotation of the kidney⁽²⁾.

Despite the availability of many treatment modalities for the stones in pelvic kidneys, like shockwave lithotripsy (SWL), percutaneous nephrolithotomy (PNL), retrograde intrarenal surgery (RIRS), laparoscopy and open surgery; choosing the best treatment modality is still confusing⁽³⁾.

We present a patient diagnosed as ectopic pelvic kidney with complete staghorn, which was managed with laparoscopic pyelolithotomy (LPL).

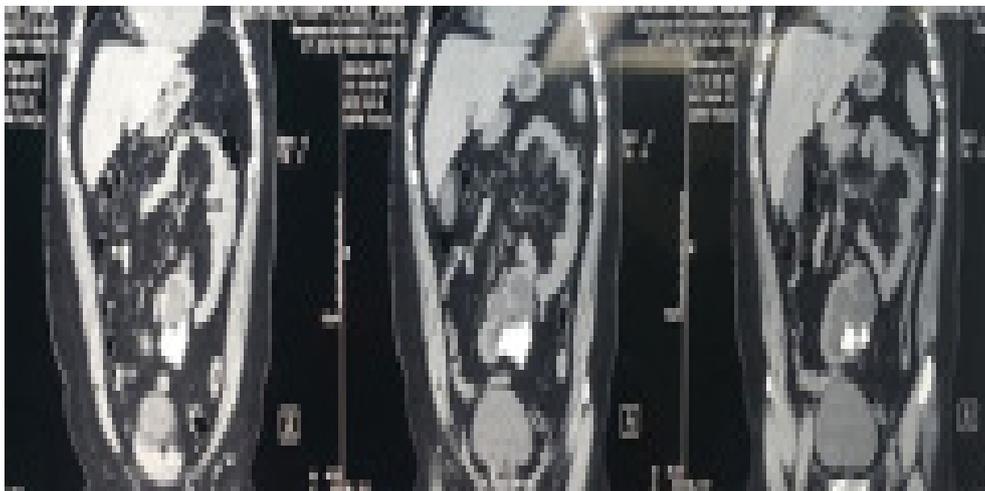


Figure 1. CT scan shows a large renal calculi in an ectopic pelvic kidney.

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CASE REPORT

A 40-year-old man was referred to our urology clinic due to vague abdominal pain and hematuria. In his past medical history, he had no previous history of urinary tract infection, renal stones, vesicoureteral reflux, or other renal diseases. On physical examination, no abnormalities were noted. Laboratory tests showed hematuria and sterile pyuria in urine analysis. A urine culture excluded urinary tract infection. Ultrasonography showed the ectopic left renal kidney with a large renal stone. Computed tomography (CT) without contrast material visualized an ectopic kidney in the left iliac fossa with a complete staghorn with Hounsfield unit of 1100 (**Figure 1**). The right kidney was in normal position.

After obtaining adequate informed consent, he was hospitalized in our department and planned for laparoscopic pyelolithotomy. The stone was larger than 2 cm so we decided not to perform SWL or RIRS for this patient. Also because the pelvis was extrarenal and anteriorly positioned, we preferred to choose pure laparoscopy instead of lap assisted PNL.

One gram of cephalotin was given to the patient preoperatively. Under general anesthesia, operation was done in supine position with a gentle lateral elevation on the left side. The surgeon stood on the right side of the patient. First, a 12 mm port was inserted at the umbilicus using the Hasson technique. After creation of pneumoperitoneum, operation was done through three 5 mm trocars arranged paraumbilical and the points between umbilicus and inguinal canal at left and right side.

Cecum and ascending colon were reflected medially by incising the white line of Toldt, and retroperitoneal space was entered. Renal pelvis was released and exposed. A vertical pyelotomy incision was made over the anterior pelvic wall and after several failed trials for stone extraction, extended to a cross figure. The stone extracted intact with a laparoscopic stone grasper (**Figure 2**) and placed in an endobag. A short double J stent was placed via the pyelotomy incision and renal pelvis was closed using continuous 4.0 vicryl sutures. Twelve mm port site was dilated and the endobag containing



Figure 2. Twelve mm port site was dilated and the endobag containing the stone was extracted by using an Endobag.

the stone was extracted (**Figure 3**). A drain was placed into the operation area through one port site, and the procedure was terminated.

The patient started oral intake after 24 hours. Drain was removed 48 hours after the operation when its output was < 30 mL. He was discharged from hospital after 3 days without any complication. Double J stent was removed under local anesthesia after 4 weeks.

DISCUSSION

The ectopic pelvic kidney is more susceptible to hydronephrosis and nephrolithiasis than normally positioned kidneys. The position of renal pelvis, ureteral insertion, kidney malrotation and renal vasculature can cause urine stasis and renal stone⁽⁴⁾. Choosing the best modality for treatment of nephrolithiasis is still a debate due to risk of injury to the aberrant vessels, adjacent organs and nerves. There are several management modalities to deal with stones of ectopic pelvic kidney like SWL, RIRS, percutaneous nephrolithotomy (PNL), laparoscopy and open surgery.

Although some studies show that SWL is a suitable option for treatment of renal stones in pelvic kidneys with stone free rate about 57%⁽²⁾ there are some limitations and technical challenges for using this modality in a pelvic kidney. Pelvic kidney is surrounded by bony structures and pelvic bone interferes with shock wave transmission and results in less effectiveness of SWL. Some studies reported that SWL can be used as an effective modality in stone fragmentation, but abnormal drainage of pelvic kidney reduces stone free rate and increases residual fragments⁽⁵⁾. Some reports presented SWL as a first line treatment in pelvic kidney stones less than 2 cm⁽⁶⁾.

RIRS is another option for treatment of renal stones in pelvic kidneys, but tortuous ureter is often associates with difficulty in access to renal pelvis. The best results of SWL or RIRS are achieved in stones smaller than 2 cm in pelvic kidneys^(4,7). We did not use these modalities for our case, because the stone was a staghorn.

Laparoscopic assisted PNL for the treatment of stones in a pelvic kidney was described by Eshghi initially⁽⁸⁾.



Figure 3. The extracted stone intact with a laparoscopic stone grasper.

The advantages of this modality include suitable exposure of the kidney, enhancing safe puncture and correct tract placement⁽⁴⁾. The majority of urologists choose this modality as preferred treatment for large stones in pelvic kidneys. In these years, successful laparoscopic pyelolithotomy for management of renal stones has advanced rapidly and some urologists prefer this modality. In comparison between PNL and LPL, risk of bleeding and nephron injury are higher in PNL related to transgression and dilation of renal parenchyma. In LPL, stones are extracted intact and stone free rate is very high in contrast to PNL in which fragmentation of stone may increase the residual fragments and decrease stone free rate⁽⁹⁾. It should be mentioned that LPL is appropriate approach for kidneys with anterior or laterally positioned extrarenal pelvis⁽¹⁰⁾. Also we experienced in our case that extending the pyelotomy incision will help to extract stones with complex shapes and suturing those incisions is possible through laparoscopy.

Laparoscopic pyelolithotomy can be performed intraperitoneally or retroperitoneally. Although the retroperitoneal access provides more appropriate access to the posterior aspect of the renal pelvis, avoids extensive dissection and eliminates peritoneal contamination with urine and blood, albeit it is not a suitable option in pelvic kidneys and we preferred the intraperitoneal route. Intraperitoneal approach is more familiar to urologists and provide better anatomical landmarks and large working space. Recently combination of laparoscopy and retrograde endoscopy has been used successfully for management of ureteral and pelvic stones^(11,12). Simultaneous endoscopy can help to locate the stone site and displace the stone to more accessible location for laparoscopic manipulation.

In conclusion, laparoscopic pyelolithotomy is a safe and effective treatment modality and can be proposed as the first line treatment for staghorn stones in ectopic pelvic kidneys with anteriorly positioned large extrarenal pelvis with minimal bleeding and renal parenchymal injury.

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